Claims: What is claimed is:

1. An instrument for detecting microbial growth in test vials containing growth media and dye material, comprising:

multiplicity of light-sensor combinations, each combination comprising of at least one light source and at least one light detector, positioned at the location of each of the test vials, said light detector positioned relative to said light sensor to detect light emitted from the dye material when said light source illuminates said dye material; and

calibration means for compensating differences among the output values of said light detector for each said combination, said calibration means providing similar output levels of said light detectors for said test vials having identical composition of said media and said dye material.

2. The instrument of claim 1 wherein said calibration means comprises:

a driver means for separately driving each said light source at a specific energy level;

a processor means for controlling said driver means; and

an algorithm embedded in said processor means, providing compensated output values of said light detectors applying a mathematical transformation to the output of said light detectors, to reduce parametric differences among the output values of said light detectors resulting from the combined performance differences among said light source and light detector combinations.

3. The instrument of claim 2 wherein each of said light sources is driven by said driver means to the same level TH measured at the output of said light detector when said test vial is removed, thereby compensating for intrinsic parametric differences among said light sources and among said light detectors, and

differences resulting from the combined performance, due to mechanical mounting processes and optical differences, of said combinations of said light sources and light detectors.

4. The instrument as in any of the claims 2-3 wherein said algorithm comprises the formula

$$Y = X(U - L) / (OL - LL) + U - OL(U - L) / (OL - LL)$$

Wherein

X is the output from said light source;

Y is said compensated value;

U is a desired maximal level common to all said compensated levels;

L is a desired minimal level common to all said compensated levels;

OL is the output of said light detector receiving energy directly from said light source when said test vial is being removed; and

LL is the output of said light detector when said light source is driven by said driver means at a level representing the minimal energy obtained from said light detector for any of said test vials.

5. The instrument as in any of claims 2-3 wherein said light source is a light emitting diode.

6. The instrument as in any of claims 2-3 wherein said light source is an incandescent lamp.

7. The instrument as in any of claims 2-3 wherein each of said light source comprises a fiber optics transferring light from a central light source to at least one of said test vials.

8. The instrument as in claim 6 wherein said light source is a light emitting diode.

9. The instrument as in claim 1 wherein said light source is an incandescent lamp.

10. The instrument as in claim 1 wherein each of said light source comprises a fiber optics transferring light from a central light source to at least one of said test vials.